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Money Supply, Financing and Economics Growth: Evidence from the NBC Central Bank Functions

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Abstract
Importantly, Central bank is a critical functional to play in supporting economic growth like as economic agent of development delivers on its commitment to necessary fiscal consolidation of the national economy. This paper only examines money supply and financing of the National Bank of Cambodia, its results stimulate growth of the productive sectors. I used the time series, regression method, ratio method to find the significant relationship money supply, financing, and economic growth, how the central bank functions effect on the economic growth, as well as, its impetus was found that a strong positive linear relationship of money supply, financing on the economic growth that reliance on outputs of the times series, ratios, and regression model that is confirmed by coefficients valued at 0.829578, 0.727115 and adjusted R-squared valued at 0.995515, 0.991338, it means equal a unitary. It is a significance of the level at $P < 0.05$; the results reveal the positive relationship money supply, financing which shows a significant influence or impact on economic growth. The paper goal gives the central bank policy makers to map out the standards of monetary policy functions to make better the extent of money supply, financing in order of accountability, transparency, and in addition the efficiency, to avail the potential communications for the economic growth.
Keywords: Money Supply, Financing, Economic Growth, National Bank of Cambodia (NBC)

1. Introduction

Shelagh (2005)'s modern banking textbook, pointed out the two debates dominate the central banking literature, the first relates to the functions of the central bank, the second to the degree of autonomy enjoyed it. Modern central banks are normally responsible for monetary control and, in addition, may be involved in prudential regulation and placing government debts on the most favorable terms possible. In effective, Central banks functions play the important role in the stability in economic growth and financial institutions. Nier (2009) expressed that expanded role of the central banks that goes beyond the tools already typically at the disposal-monetary policy could enhance the overall effectiveness of financial regulation, allowing synergies to be exploited with new regulatory tools. As we have known and empirical studies from the existing of the economic performance data have been showing that central banks in the world, its functions to pay attention in accountability, efficiency and defense for economic growth. For examples, advanced, emerging and developing countries the central banks have putted important efforts on the monetary policy to build economic structures for growth, full employment and prosperity. But some central banks play monetary policy variables (interest rate, foreign exchange and cash reserve) was applied to deliver the financing supports to both public-private sectors aimed to ensure the economic growth and full employment. In addition to the central bank's functions can become a great important responsible to mitigate the economic problems. For examples, Slowdown growth in the United States, Fed have been cut interest rate at the lower level mainly objectives to recover economic growth. Deflationary economy happened in Japan in a several years, the Bank of Japan (BOJ) ordered monetary policy to provide lower interest rate for recovery economic growth from the deflationary positions. During the declining domestic demand, slowdown industrial production so Chinese central bank have been using monetary policy variables to stimulate financial packages to keep the Chinese economic growth at the level of target growth by 7% per annual, this is have been confirmed by the Chinese government strongly. For examples, 1960s in Japan, central bank implemented the fixed exchange rate policy for the selected export firms those who exported the industrial products or commodities to foreign markets included United States, France, Italy, and Germany. In addition, 1970s, 1980s, 1990s, China, central bank adopted the fixed exchange rate policy for the selected firms those who exported industrial products or commodities to oversea markets, and in addition government special economic zones. In this method aims to make a strong economic growth in the national economy and sharing the World, such as in the several years Japanese economy was ranked 2 of the largest economy in the world, but now the rank 2 moved to China. Further, Chinese central bank needs to stabilize the sustainable economic growth rate about 6.7%, and particularly as to defense the Chinese yuan depreciations against US dollars thereby Xinhua (2016) released the Chinese central bank injects 437 billion yuan (about 64.7 billion US dollars) into the financial system in market operations via the medium-term lending facility (MLF) with interest rate charge 2.85% for the six-month loans 230 billion yuan, 3% for the one year loan 207 billion yuan further the Chinese central bank has provided the fund for 21 financial institutions already, aims to help commercial banks and China's three policy banks maintain liquidity by allowing the banks to borrow from the central bank by using security as collateral, and in addition Chinese central bank

needs to maintain a prudent monetary policy with timely fine-tuning to create a favorable environment for both growth and debt reduction. The economic point of view, the key monetary policy variables is delivering financial resources on the both conventional and unconventional frameworks with lower interest rate, foreign exchange, and other determinants on economic growth. For examples, the Fed has determined the reserve requirements 0 to 10% this reserve requirements or liquidity ratio is a minimum value set by the Board of Governors of Fed system. NBC (2016) has been expressing as for 37 years ago, that NBC central bank plays the important role in the contribution to the development of banking and finance sector in Cambodia; its results remarkably have a progress and integrated to the regions. Particularly in the implementations of the prudential of monetary policy in aims to maintain the price stability forwards to meet the government policy. However, monetary policy instruments has placed in the market platforms including exchange rate between Riel & US dollar currency stabilized under management of NBC, foreign reserves increases, change in inflation rate at low level has well controlled. For example, since the declining the price of agricultural products, Cambodia's central bank have pointed out their promise to play the important functions to support the government economic policy to keep the stability in economic growth, particularly in the constant macroeconomic growth. Chea Srey (2016) emphasized on the liquidity-providing collateralized operation (LPCO) is to (i) establish benchmark rate for the market so as to serve the conduct of the monetary policy based on the market mechanism, (ii) to promote the negotiable certificate of deposits (NCDs), which then be used as collateral in interbank market transactions, (iii) to promote the use of Riel, (iv) to support agriculture sector development and (v) to contribute to lower the current high interest rate in local currency (Riel).

The research paper emphasize the sections (1) introduction on our objectives, scale of study and research (2) literature review and hypothesis development this section to explore the implications of ideas, theory and interest on the relationship money supply, financing and economic growth and then create the hypothesis for the appropriate the outputs growth. (3) research method this section to build research model for analyzing. (4) results this section is the translation the outcome of analysis based on the statistical data in findings and (5) conclusion. In effective, the research question is formulated in this research study: what extend the money supply and financing has influenced on economic growth in the NBC central bank functions? This study goal is to confirm that the relationship of money supply (MS), financing (FINAN) and economic growth, the trend in MS & FINAN and economic growth to provide the NBC central bank policy makers, economic planners, decision powers to create their policy variables and business models in aims to support constant economic growth as well as to stabilizing macroeconomic growth in terms of under maintenance of GDP growth, full employments, low inflation and unemployment at the level of expected target was forecasted.

2. Literature Review and Hypothesis Development

2.1. On View of Literature

Epstein (2005) shows in the role of central banks in development, as to based on the most historians identify the central bank following functions as being historically essential to the operations of central banks: (1) unifying and issuing the country's banks notes; (2) acting as the government's bank; (3) acting as the commercial banks' bank; (4) serving as a lender of last resort to banking and even the financial system as a whole; (5) conducting monetary policy to manage the foreign exchange and the price level. Other activities have been added to this list: (6) conducting monetary policy to manage the overall level of economic activity and (7) allocating credit to promote national goals. Sinha (2010) points out that central bank as banker, agent and adviser to the government by mainly functions: (1) the central bank performs the same functions for the government as commercial bank performs for its customers. It maintains the account of control as well as state governments, it receives deposits from government; it makes short-tem advances to the government, it collects cheques and drafts deposited in the government for repaying external debt or purchasing foreign goods or making other payment as a banker; (2) as an gent to the government, the central bank collects taxes and other payments on behalf of the government. It raises loans from the public and thus manages public debt. It also represents the government in the international financial institutions and conferences; (3) as a financial adviser to the lent, the central bank gives advise to the government on economic, monetary, financial and fiscal matter such deficit financing, devaluation, trade policy, foreign exchange policy, etc. Athanasios (2007) shows the Taylor rules are simple monetary policy rules that prescribe how a central bank should adjust it interest rate policy instrument in a systematic manner in response to developments in inflation and macroeconomic activity. Alex Nikolsko, David H. (2012) emphasized that the Taylor rule (1993), monetary policy postulated to be followed by central banks will beneficial to the economy can be specified. John Taylor (1993) on discretion versus policy rule in practice to emphasize this rule closely approximates Federal Reserves policy during the past several years. In addition to the policy reported in Taylor (1993) is generally consistent with these results as using his multi country rational expectations model, he stimulated economic performance of the G-7 countries under several different monetary policy rules. Economic performance was examined under different policy rules. The policy rules were ranked according to how successful they were in achieving price stability and output stability. Although there is not consensus about the size of the

coefficients of policy rules, it is useful to consider what a representative policy rule might look like. One policy rule that captures the spirit of the recent research and which is quite straightforward is:

$$r = p + .5y + .5(p - 2) + 2$$

Where, r is the federal funds rate, p is the rate of inflation over the previous four quarters, y is the percent deviation of real GDP from a target. That is, y = 100(Y-Y*)/Y* where Y is real GDP, and Y* is trend real GDP (equals 2.2 percent per year from 1984.1 through 1992.3).

He points out that a flexible exchange-rate system will work better if country-specific shocks to the consumption or investment equations have relatively large variance. For the flexible exchange- rate regime, he assumed that each central bank adjusts its short-term interest-rate target in response to changes in the price level and real output from a target. However, for the fixed exchange-rate system, the interest rates in the individual countries cannot be set independently of one other. He raised up the example, if the Fed raised the Federal funds rate above the Japanese call money rate, funds would flow quickly into the United States putting upward pressure on the dollar and threatening the fixed rate unless the Bank of Japan likewise raised the call money rate. In order to keep exchange rates from fluctuating, therefore, a common target for the world short –term interest rate must be chosen. Analogously, with the flexible exchange-rate case, it was assumed that the world short-term interest rate rises if the world price level rises above the target. He compares the flexible exchange-rate system with the fixed exchange-rate system shows that the fluctuations in real output are much larger in the United States, France, Germany, Italy, Japan, and the United Kingdom when exchange rates are fixed, compared with when they are flexible. The standard deviation of output nearly doubles in Germany and Japan under fixed exchange rates in comparison with flexible exchange rates. The fluctuations in real output in Canada are slightly less under fixed rates than under flexible rates, but there is deterioration of price stability in Canada under fixed exchange rates. A change in the Canadian domestic policy rule under flexible exchange rates could easily match the output stability of the fixed exchange rate case with more price stability. In this sense, John Taylor considered the flexible exchange rate system dominates for all the countries.

Monetary policy decisions of European Central Bank or ECB (2016) points out that interest rate on the main refinancing operations and the interest rates on the marginal lending facility and the deposit facility remain unchanged at 0.00%, 0.25% and -0.40% respectively. The governing council continues to expect the key ECB interest rate to remain at present or lower level for an extended period of time, at well past the horizon of the net asset purchases. Regarding non-standard monetary policy measure, the Governing Council confirms that the monthly asset purchases of 80 billion euro are intended to run until the end of March 2017, or beyond, if necessary, and in any case until it sees a sustained adjustment in the path of inflation consistent with its inflation aim.

2.2. Hypothetical Related Evidence

NBC (2002) uses monetary policy and monitor monetary development to ensure that the monetary trend is in line with demand of the real economy. The growth of money supply will be maintained at the appropriate pace taking into account the declining money velocity that reflects the increasing confidence of the general public in the banking sector. The restricted monetary policy with respect to credit the government will be continued to ensure price stability. Evidently, the NBC (2003) projection for main monetary aggregates is described in the note 1. Most of the central bank in the world wants their monetary policy plays the important function in money supply and financing for the economic growth sectors and welfare of the country. Serey Chea (2016) expresses that the National Bank of Cambodia (NBC) has committed to action plan to promote gender and women financial inclusion. For example, Cambodia, women access to financial services is inclusive at Microfinance level where 78% of borrowers are women.

Majone (1997; Bernanke (2004b) pointed out that independent central banks would be able to secure low inflation and increasing the reliance on industry self-regulation would allow financial innovation contributing to economic prosperity. Levine (2005) expressed that more credit means increased access to finance and greater support for investment and economic growth. Bernanke (2004a) pointed out that the bank of Japan's recent policies illustrates the certainty of communication policies. In April 1999, the bank of Japan not only reduced its call rate to within a few points of zero, it also announced its attention to keep the call rate at zero until deflationary concerns are dispelled. This policy, known as the zero-interest rate policy (ZIRP), was interruptedly a 25-basis point rise in the call rate in August 2000 but then effectively reintroduced in March 2001 in conjunction with the bank of Japan's new policy of quantitative easing. Williams (2015) said that a typical estimate is that a 1% loss in GDP is associated with 4% reduction in house prices. This implies affect costly trade off of using monetary policy to affect house prices when macroeconomics and financial stability goals in conflict. Reuven (2016) viewed that on these differences in economic performance have resulted in diverging monetary policy stances. The United States has begun to normalize its monetary policy and its expectations to tighten it more in the future-through more negative rates on reserve deposits and greater quantitative easing. The change in GDP growth of Cambodian economic performance by developing the productive growth sectors including agriculture, manufacturing and service

supported by the central bank's functions.

NBC (2016) pointed out that to support government economic policy to ensure the standards of macroeconomic stability. The evidence in the central bank' role in during the declining of agricultural products, particularly items in paddy and rice as the central bank have requested the association of bank in Cambodia (ABC) and the Cambodia microfinance association (CMA) in order to response the tasks including (1) continuing and expanding loans with affordable interest rate to agricultural sector, especially paddy and rice sector, (2) providing more flexible repayments methods to vulnerable customers, (3) continue monitoring and communicating with vulnerable customers to find appropriate solutions, (4) continue implementing consumer protection mechanism based on international best practices. This experimental monetary policy in the ECB have applied for the their economic growth and stability in full employment as Mario (2016) points out that to protect price stability, the ECB used its instruments in a manner it had not done before and developed new tools-all within our mandate. ECB reduces interest rates to very low levels, provided targeted financing to support bank's lending to firms and households, and started a large-scale asset purchased programme.

Shelagh (2005) she also emphasized the simple equation on the money supply and inflation is

$$\hat{P} = M\hat{S} - \hat{y}$$

$$M\hat{S} = \hat{P} + \hat{y}$$

Where, $\hat{P}$ is the rate of inflation, i.e., the rate of change in the price level over a given period of time (month, year), $M\hat{S}$ is the rate of growth in the money supply, where the money supply can be defined as "narrow" money (e.g. cash + sight deposits at the banks) or "broad" money (narrow money + times deposits, CDs, etc.), and is the rate of growth of real output (e.g. real GNP). This equation is a good idea for the central banks monetary $\hat{y}$ policy makers need to target the growth rate of money supply to fit the economic output growth rate. As we have known that the NBC central bank functions including regulations, supervisions and monetary policy are so important to contribute to the economic growth in the Cambodia's context. The results of the literature views and hypothetical related evidences mentioned above is relative to our hypotheses formation, definitely we can emphasize hypotheses: (H1) there is a significant relationship between money supply and economic growth, (H2) there is a significant relationship between financing and economic growth, (H3) there is relationship between money supply, financing have been associated with the economic growth.

3. Research Method

Cambodia's economic growth is so important role in the maintaining stability in the society's progress. For 1.5 decades, Cambodia's economic growth strongly stood in the annual average at 7.6%, as began from year 2001-2015, its ranking was number 6 in the World, and in addition, the World Bank recently reported that Cambodian economic growth can bring the GDP per capita into the middle income trap from the lower income trap. These results have been contributed from the several driving forces, which include agriculture; garment exports, tourisms, and real estate investment increase those to stimulate Cambodia's economic growth. In effective, to investigate the important influence on the driving forces to generate the economic growth by focusing the banking investment area, evidently the NBC central bank has been contributing to stabilize the macroeconomics, interest rate, especially on maintaining foreign exchange between local currency Riel and US dollar, in addition the contributions of central bank to reduce 1% of poverty eradication per year with the government policy. Accordingly Esptein (2005) currently pointed out best practice approach to central banking consists of the following (1) central bank independence, (2) a focus on inflation fighting (including adopting formal inflation targeting and (3) the use of indirect methods of monetary policy (i.e., short-term interest rates as opposed to direct methods such as credit ceilings.) Esptein also observed that the early and recent history of central banking in the United States, United Kingdom, Europe and elsewhere, financing governments, managing exchange rates, and supporting economic sectors by using direct methods of intervention have among the most important tasks of central banking.

As we have known that the NBC central bank has played their functions and responsibilities through price stability, stabilized foreign exchange rate between local currency and foreign currency, particularly in between Riel and US dollars, maintaining increases in foreign reserves, its policies to keep low inflation within inflation target but the Ministry of Economy and Finance of Cambodia has targeted inflation rate around 5% and low unemployment rate by 4% as possible. However, the NBC central bank has mainly objective to support the government economic policy in aims to boosting economic growth. By year 2016, the growth of banking structures has been calculated that 35 commercial banks, 9 specialized banks, and 38 microfinance institutions as shows in the note 2, are running the operation of financing in the productive economic sectors such as agriculture, manufacturing, and services, and in addition, the NBC central bank makes the stability in price of Riel with US dollars and more use of Riel currency in economic activities by cooperation with the government policies including Rectangular Strategy Phase II, 2008-2013, Phase III, 2013-2018, National Strategic Development Plan, 2014-2018, and the Financial Sector Development Strategy (2001-2010, 2006-2015, 2011-2020). Vouthy (2016) points out

the policies to promote Riel use, that government and the National Bank of Cambodia central bank have implemented policies are (1) enhance public confidence in Riel through stabilization of the exchange rate against US dollar, (2) differentiated between the reserve requirement rate in Riel and US$ deposits to promote financial intermediation in the Riel, (3) provided liquidity instruments in Riel to financial institutions by issuing Negotiable Certificate of Deposits in Riel, (4) introduced liquidity-providing collateralized operation to provide Riel liquidity with lower interest rate to banks and financial institutions, and the government has functions are that required all taxes and utility costs to be paid only in Riel, salary of public sector officials are paid in Riel, opened Riel-based payroll bank accounts for public sector employees, improved the awareness on the importance of the Riel through various campaigns, films, and documents, required price tag to be set in Riel (Regulation by the Ministry of Commerce), launched campaign on exchanging of old Riel banknotes to new notes, introduced fast system as a Riel-based retail electronic payment which allow customers to receive the transferred funds immediately.

NBC central bank has made the survey the sample 856 enterprises, 2,273 households, 10 selected commercial banks, 5 selected microfinance institutions in the 25 provinces of Cambodia, the results show that all transactions was utilized the 65% US dollars currency for their business operations. Economic point of view, the central bank should make effort on the keeping of stable price of Riel and implementations of monetary policy role in foreign exchange, finance providers, increase instruments of the based money and broad money, in order to more attractive economic growth because of the economic system has dominated exchange of US dollars currency, probably 80% of use United States currency in the economic activities. The money supply and financing have moved around the economic activities in Cambodia for the 5 years (2011-2015), as totally structural bank's money supply only included monetary based (M1) and broad money (M2) about 48,754 million US dollars and financing sources about 38,959 million US dollars the gross domestic products (GDP) growth for 5 years about 75, 903 million US dollars in terms of the constant price. However, it has a non- performing loan about 19.8 million US dollars in 2013. Bernanke (2010) explained that broad financial condition, including monetary policy, are supportive of growth, and banks appear to have become somewhat more willing to lend.

3.1 Data collection

We have decided to collect the statistics data based on the secondary source from the National Bank of Cambodia central bank's report. In addition to the complement of the statistics data, we need to take it from the useful sources including Ministry of Economy and Finance (MEF), WB, ADB, and IMF and also from the newspapers and working papers or research papers that are related to our research's objectives.

3.2 Sample

We have decided Five years of observations of data on money supply, financing and economic growth, as the data was started from year 2011 to 2015. And for our analysis also based the sample statistics data of the variables on money supply which combines M1 (currency outside banks and demand deposits) and M2 (M1 + Quasy money (time and saving deposits and foreign currency deposits), financing variables data combines 1+ 2 + 3 + 4 according to data selected from the National Bank of Cambodia's Annual Report 2015 was published by NBC (2016), to emphasize the credit granted classified by ownership in the economic sector on 1 financial institutions, 2 non-financial institutions, 3 personal essentials, and 4 other lending.

3.3 Research model

We have decided to identify the variables that be selected to construct the research model in this study.

Table 1: Design of Variables

Concept	Variable	Indicator	Measure	Symbol
Money supply	monetary base, broad money.	quantities of money were used.	currency outside bank, demand deposits, quasy money, in million US dollars.	M1, M2
Financing	1financing institutions, 2 non-financial institutions, 3 personal essentials, 4 other lending.	financing source for the economics productive sector.	credit granted classified by ownership in the economics sector, in million US dollars.	FINAN (it combines 1 + 2 + 3 + 4)
Economic Growth	Gross Domestic Products	Economic growth with the constant price	Gross domestic products growth per year, in mil..US dollars	EG

So we create the formulation of research model based on the economic growth function $Y = F\ (MS, FINAN)$, instead of the simple regression method is $Y_t = \beta_0 + \beta_1 MS_t + \beta_2 FINAN_t + \varepsilon_t$, However, we can assume that Y_t is output of growth, year time is t, β_0 is intercept, β_1, β_2 is estimated parameter and β_1, β_2 is a positive slope ($\beta_1, \beta_2 > 0$), ε_t is a random error, and in addition, Y is considered dependent variable is EG, MS and $FINAN$ is considered

independent variables. In effective, we can use the sample regression method to construct our research model is $EG_t = \beta_0 + \beta_1 MS_t + \varepsilon_t$ and $EG_t = \beta_0 + \beta_1 FINAN_t + \varepsilon_t$ that aims to apply in our study.

3.4 Data analysis method

We use times series, simple regression, ratios based on the statistics data in million US dollars in terms of conversation of local currency Riel within the official exchange rate from the central bank, was collected. In effect, the aims to find the trends of the money supply, financing and economic growth, the coefficients, adjusted R-squared values of the money supply, financing and economic growth in the Cambodian economic performance perspectives. We use the software Eviews 8 to evaluate the all inputs selected.

Time series analysis

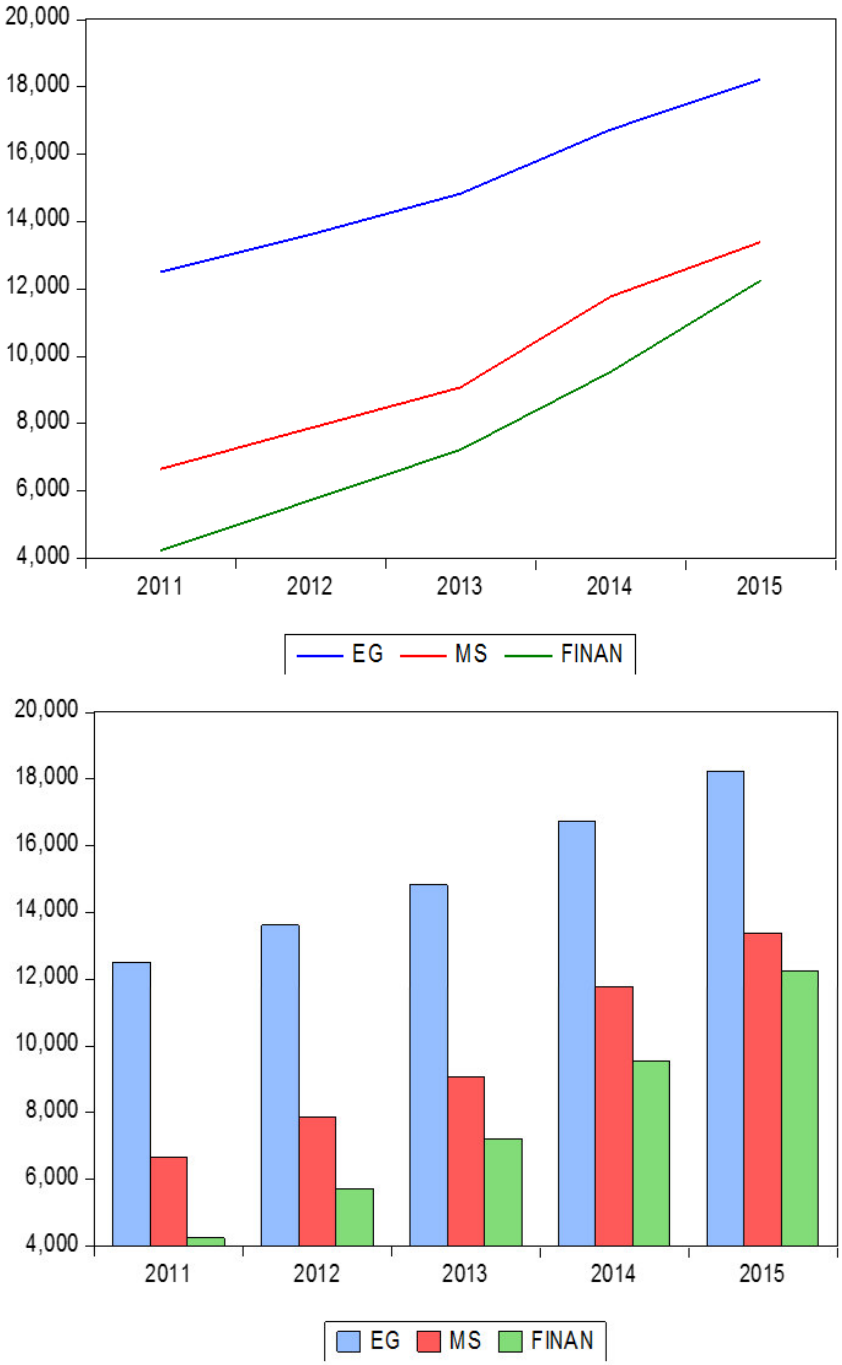

Figure 1. The trends of MS, FINAN and EG in 2011-2015, as US$ million

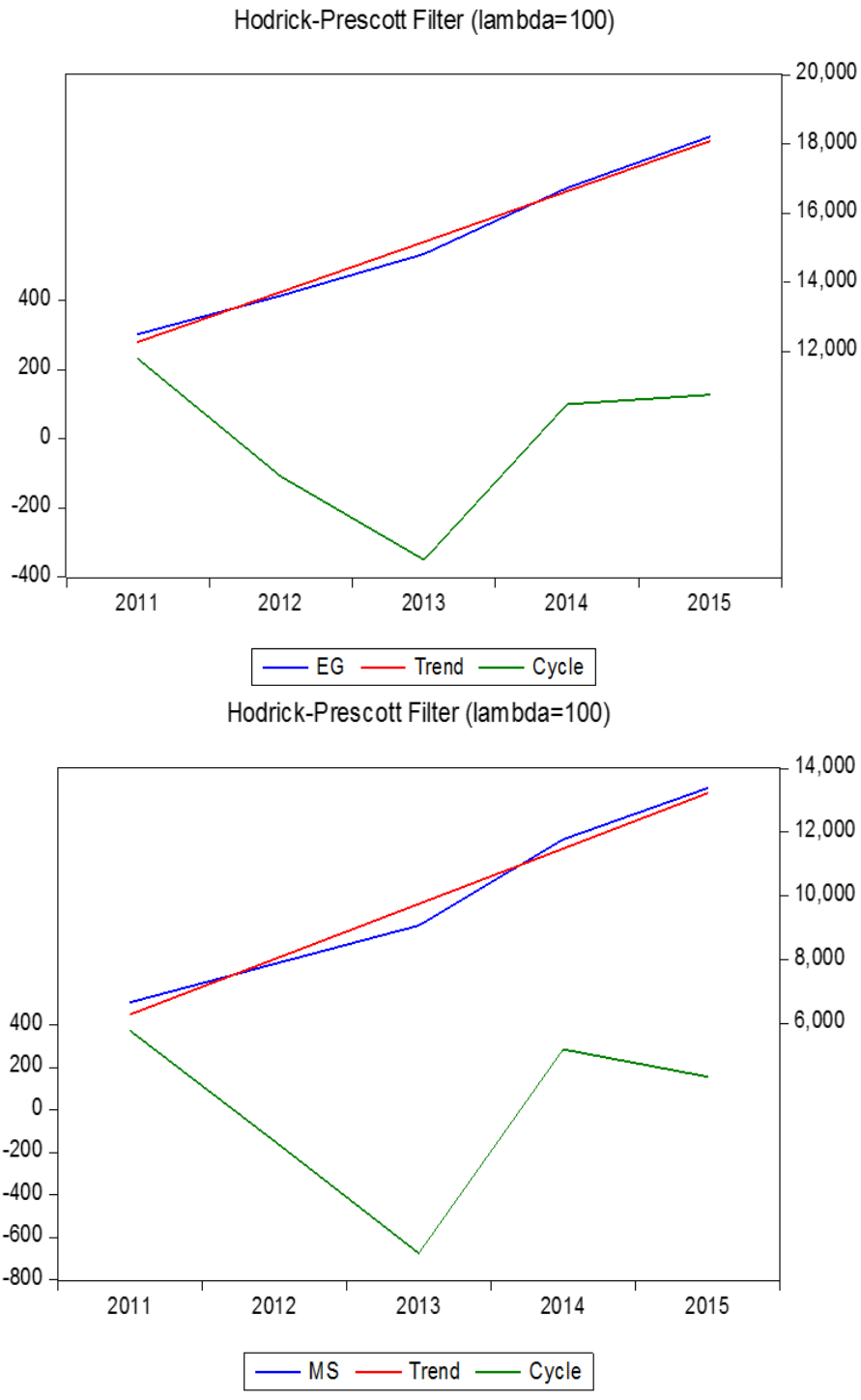

Figure 2. HP Filter of EG, MS, and FINAN

Regression analysis

Table 2. Covariance analysis: Ordinary. Sample: 2011 2015. Included observation: 5

Covariance Correlation Probability	EG	MS	FINAN
EG	4274142. 1.000000 -----		
MS	5134859. 0.998317 0.0001	6189724. 1.000000 -----	
FINAN	5840028. 0.996746 0.0002	7009691. 0.994163 0.0005	8031776. 1.000000 -----

Table 3. Factor method: Maximum Likelihood

Covariance analysis: Ordinary correlation
Sample: 2011 2015
Included observations: 5
Number of factors: Minimum average partial
Prior communalities: squared multiple correlation
Convergence achieved after 6 iterations

	Loadings F1	Communality	Uniqueness
EG	1.000000	1.000000	0.000000
FINAN	0.996746	0.993503	0.006497
MS	0.994981	0.989987	0.010013

Factor	Variance	Cumulative	Difference	Proportion	Cumulative
F1	2.983490	2.983490	---	1.000000	1.000000
Total	2.983490	2.983490		1.000000	

	Model	Independence	Saturated
Discrepancy	0.035963	9.676259	0.000000
Chi-square statistic	0.143851	38.70504	---
Chi-square prob.	NA	0.0000	---
Bartlett chi-square	0.053944	20.96523	---
Bartlett probability	NA	0.0001	---
Parameters	6	3	6
Degrees-of-freedom	0	3	---

Table 4. Principal components analysis

Sample: 2011 2015
Included observations: 5
Computed using: Ordinary correlations
Extracting 3 of 3 possible components

Eigenvalues: (Sum = 3, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	2.992818	2.986805	0.9976	2.992818	0.9976
2	0.006013	0.004845	0.0020	2.998831	0.9996
3	0.001169	---	0.0004	3.000000	1.0000

Eigenvectors (loadings):

Variable	PC 1	PC 2	PC 3
EG	0.577784	-0.155441	-0.801252
MS	0.577285	-0.616154	0.535814
FINAN	0.576982	0.772135	0.266270

Ordinary correlations:

	EG	MS	FINAN
EG	1.000000		
MS	0.998317	1.000000	
FINAN	0.996746	0.994163	1.000000

Table 5. Dependent variable: EG

Method: Least Squared
Sample: 2011 2015
Included observations: 5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS	0.829578	0.027824	29.81510	0.0001
C	7091.716	279.9938	25.32812	0.0001

R-squared	0.996637	Mean dependent var	15180.60
Adjusted R-squared	0.995515	S.D. dependent var	2311.423
S.E. of regression	154.7896	Akaike info criterion	13.21118
Sum squared resid	71879.42	Schwarz criterion	13.05496
Log likelihood	-31.02796	Hannan-Quinn criter.	12.79189
F-statistic	888.9400	Durbin-Watson stat	2.653040
Prob(F-statistic)	0.000083		

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FINAN	0.727115	0.033948	21.41874	0.0002
C	9515.063	281.4664	33.80532	0.0001

R-squared	0.993503	Mean dependent var	15180.60
Adjusted R-squared	0.991338	S.D. dependent var	2311.423
S.E. of regression	215.1296	Akaike info criterion	13.86953
Sum squared resid	138842.3	Schwarz criterion	13.71331
Log likelihood	-32.67383	Hannan-Quinn criter.	13.45024
F-statistic	458.7624	Durbin-Watson stat	2.221685
Prob(F-statistic)	0.000223		

Table 6. Dependent variable: EG

Method: Least squares
Sample: 2011 2015
Included observations: 5

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS	0.527466	0.231488	2.278584	0.1503
FINAN	0.266772	0.203216	1.312750	0.3197
C	7958.856	706.7502	11.26120	0.0078

R-squared	0.998193	Mean dependent var	15180.60
Adjusted R-squared	0.996387	S.D. dependent var	2311.423
S.E. of regression	138.9433	Akaike info criterion	12.98972
Sum squared resid	38610.48	Schwarz criterion	12.75538
Log likelihood	-29.47430	Hannan-Quinn criter.	12.36078
F-statistic	552.4951	Durbin-Watson stat	1.629605
Prob(F-statistic)	0.001807		

Table 7. Engle-Granger Co integration Test

Null Hypothesis: series are not co integrated
Automatic lags specification based on Schwarz criterion (maxlag=0)

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
EG	-1.791286	0.8011	-3.924703	0.9548
MS	-2.514164	0.5487	-5.094148	0.6520
FINAN	-1.923156	0.7573	-5.202022	0.5952

*MacKinnon (1996) p-values.
Warning: p-values may not be accurate for fewer than 20 observations.
Intermediate Results:

	EG	MS	FINAN
Rho - 1	-0.981176	-1.273537	-1.300506
Rho S.E.	0.547749	0.506545	0.676235
Residual variance	10134.13	25540.23	73397.20
Long-run residual variance	10134.13	25540.23	73397.20
Number of lags	0	0	0
Number of observations	4	4	4
Number of stochastic trends**	3	3	3

**Number of stochastic trends in asymptotic distribution

Table 8. Pairwise Granger Causality Tests

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
MS does not Granger Cause EG	4	8.81241	0.2069
EG does not Granger Cause MS		5.72533	0.2520
FINAN does not Granger Cause EG	4	0.30047	0.6808
EG does not Granger Cause FINAN		0.25336	0.7031
FINAN does not Granger Cause MS	4	2.63093	0.3517
MS does not Granger Cause FINAN		0.01508	0.9222

Ratio analysis

Table 9. Relationship of MS, FINAN to EG

	MS	FINAN	Date
EG	0.53	0.34	2011
EG	0.58	0.42	2012
EG	0.61	0.49	2013
EG	0.71	0.57	2014
EG	0.73	0.67	2015

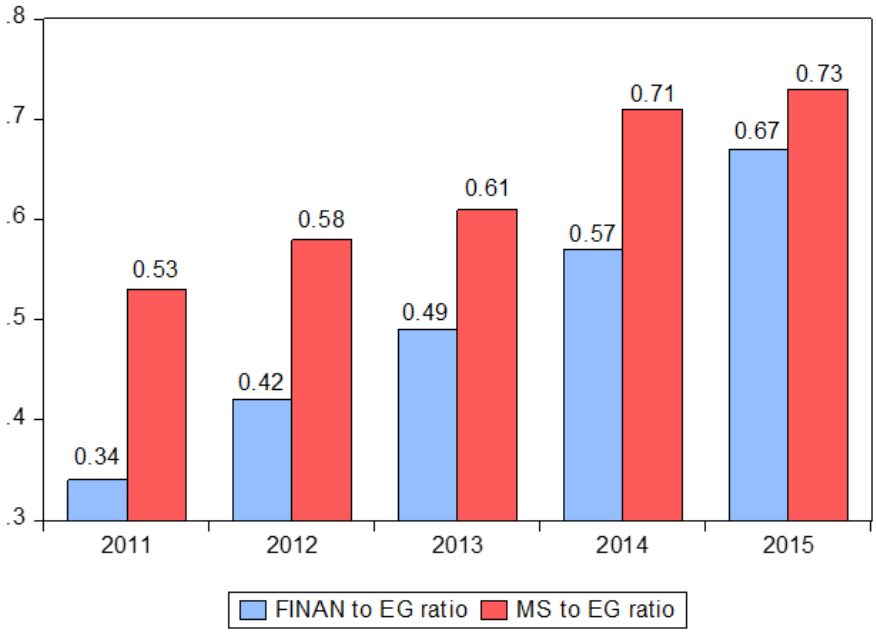

Figure 3. Relationship of MS, FINAN to EG

4. Results

According to the time series analysis, we used the data of variables as money supply (MS), financing (FINAN). In the figure 1, we found that increase in the positive growth of the variables, we observed that money supply has been increased more than financing variable but both variables have associated with economic growth significantly. In the figure 2, we found that the trends of the variables such as MS, FINAN, and EG was a positive linear but the cycle of MS, FINAN, and EG variable is dropped down in 2013 but positive numbers bigger than the numbers in 2011, 2012 but less than numbers in 2014, 2015 based on HP-filer (Lambda=100) analysis's outputs. The overall results positively showed the steady growth of the variables MS, FINAN, and EG from 2011 to 2015. So Cambodia's economic performance as well as economic growth has been enjoyed in the 5 years. According to the regression analysis, we used the data of variables was collected from 2011-2015 to analyze the variables relations, in the table 2, 3, 4 we have found that higher correlation in each variables based on the covariance analysis, and in this variables model showed the discrepancy valued at 0.035963, and chi-square statistics valued at 0.143851 based on factor method, and in addition we have used the principal components analysis in the variables, showed that the ordinary correlations of variables is nearly equal unitary and the eigenvalues and eigenvectors is a positive more than zero, the directions of the variables which it is stretched, as a result there is a significant relationship between money supply and economic growth, there is a significant relationship between financing and economic growth, which is a significant at 0.05 levels ($P<0.05$). Further, the relationship between money supply, financing is in a positive linear therefore we decided to accept the hypothesis 3 (H3): there is relationship between money supply, financing have been associated with the economic growth. In the table 5, the results of regression analysis we found that MS variable has the coefficient valued at 0.829578, R-squared valued at 0.99637 and it has p-valued at 0.0001 as a result the strong relationship MS and economic growth therefore we accepted the hypothesis 1 (H1): there is a significant relationship between MS and economic growth (EG). And we also found that independent FINAN variable has the coefficient valued at 0.727115, R-squared valued at 0.993503 and it has p-valued at 0.0002 as a result the positive relationship FINAN and economic growth (EG) therefore we accepted the hypothesis 2 (H2): there is significant relationship between FINAN and economic growth (EG). Further, the two independent variables MS and FINAN have the important influence on the economic growth in which is a significant at 0.05 levels ($P<0.05$). In the table 7 and 8, we have found that Engle-Granger Co integration Test on the variables, null

hypothesis, and the dependent of variables EG, MS, and FINAN mostly in significant relationship at the p-values 0.9548, 0.6520, and 0.5952. Pairwise Granger Causality Tests showed that about 89% of MS and EG has influenced relationship, 75% of FINAN and EG has influenced relationship, and about 65% of FINAN and MS have influenced relationship. Based on the two tests we decided to accept the hypotheses: H1, H2, and H3. In the table 9, figure 3 regarding the ratio analysis we can identify the variables relations, the relationship of MS about 63% of the economic growth in the average per year, the relationship of FINAN about 50% of the economic growth in the average per year. Therefore outputs of ratio analysis, it was confirmed that MS and FINAN have impacted on the economic growth significantly.

5. Conclusion

Such as commercial banks, MFIs and other agents include government want to borrow money from the central bank for growth of their communications, business models and economic activities based on the principles of central bank functions in money supply and financing with the comfortable conditions, and in terms of conventional mechanism. According to our observation and studies, their capital sources (as showed in note 3) are mostly come from the foreign countries or international institutions included ADB, WB, IMF, or strategic economic cooperation partners those who can supply finance at low interest rate and with good coordination for Cambodia's financial sectors such as banks, MFIs, other credit agents as a result its budgets has been contributed to the strong Cambodia's economic growth and demand increase. For the 37 years ago of the NBC central bank performance, the money supply and financing was a good position because of under the NBC central bank functions however the NBC central bank management and leaderships, responsibilities as functions have limited, particularly in the monetary policy have been played the important role in the money supply, financing associated with the economic growth in the stability it was confirmed by outputs of regression, times series, ratio analysis. We saw that money supply and financing have been increased in year to year, and in addition its relations to the economic growth significantly based on results of selected data have calculated. The NBC central bank should increase the growth rate of money supply equals the rate of economic growth concentrated on the Cambodia's economic performance so its growth can assist the central bank functions wok well in forwarding to stabilize the national economy, and additionally in its capacity able to manage inflation rate, price stability, foreign exchange, as particularly to classify the contributions of the central bank into the government economic policy. NBC central performance of year 2011-2015, our analysis of the regression model, time series and ratio was found that a strong positive linear relations of MS, FINAN to the economic growth, and in addition the NBC central bank has good right functional positions in monetary policy frameworks to challenge the strong dollarized- economy and price falls in the agricultural products particularly rice products, even though the NBC central bank contributions is evidently able to stabilize the annual average economic growth at 7.6% for the Five years ago. Further, the NBC central bank should formulate the monetary policy standards as finance provider and potential model means that central bank should play roles in the selection of the strategic economic cooperation partners or pick up winner policy in order to build the growth of the economic productive sectors like agriculture, manufacturing, and services, and as well as to intervene the structures of economic development aims to boost growth in the Cambodia's context and to share benefits to the global. The regression analysis outputs show that the money supply, financing have the significant positive relationship and also the money supply and financing have the important influence on the economic growth in the Cambodia's context confirmed by the adjusted R-squared valued at 0.99 however the money supply and financing have been associated by 99 percent has been impacted on the economic growth. NBC central bank should increase more money supply and financing through measurements of monetary policy standards meaning that central bank is the finance provider objectively to guarantee stability in the potential productivity growth in Cambodia inclusive. In 1960s, Cambodia had the prosperous economy because of the central bank and government established the special interventions based on the monetary and fiscal policy tools direction for the state-owned enterprises included state commercial banks, state trade agents as a result the GDP growth average per year about 5%.

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Notes

Note 1, this is the table A1 for note 1. Note 2, this is the table A2 for note 2. Note 3, this is the table A3 for note 3.

Table A1. The Rate of Monetary Aggregate Projection, 2003

Descriptions	Projection Rate
Money Supply (only M2)	20.5%
Currency in currency deposit	22.0%
Foreign currency deposit	20.0%
Net foreign assets	11.5%
Net domestic assets	14.5%

Source: NBC, 2003.

Table A2. The lists of Financial Institutions Operations in Cambodia

Date	No. Banks	No. MFIs	Banks Credit	Bank Deposit	MFIs Credit	MFIs Depo.
2011	35	25	4,337	5,880	636	114
2012	35	30	5,890	7,651	877	275
2013	39	35	7,414	8,918	1,307	442
2014	44	39	9,615	11,857	2,035	912
2015	46	53	12,032	13,783	3,015	1,305

Source: NBC (2016). Banks credit, Bank deposit, MFIs credit, and MFIs deposit in Million US dollars. No.: number.

Table A3. Financial sources (share of paid up capital) of banks in Cambodia, as 2014

Banks	Foreign share	Banks	Foreign share	Banks	Foreign share
ACLEDA	49%	MB	100%	PPCB	100%
ABA	100%	CUBC	100%	RHB	100%
AGRI	100%	CIMB	100%	Sacomb	100%
ANZR	55%	Mega	100%	SHB	100%
BOC	100%	PLB	100%	SKB	100%
BIPP	100%	HLB	100%	TCB	100%
BKB	100%	ICBC	100%	UCB	100%
CAB	100%	KBC	100%	ASB	100%
POST	100%	KTB	100%	ACB	100%
CCB	45%	MJB	100%	CAM	100%
CPB	100%	MYB	100%	CKSB	100%

Source: NBC (2014). Minimum paid up capital of banks and specialized banks is 150, 000 million riel and 30,000 million riel.